DOCUMENT RESUME

ED 286 461 IR 012 396

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TITLE A Model Code of Ethics for the Use of Computers in Education.
PUB DATE 16 Apr 86
NOTE 21p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 20-24, 1986).
PUB TYPE Guides - Non-Classroom Use (055) -- Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; *Courseware; *Delphi Technique; Elementary Secondary Education; Equal Education; *Ethics; *Guidelines; Interprofessional Relationship; Material Development; *Models
IDENTIFIERS *International Council for Computers in Education

ABSTRACT

Two Delphi studies were conducted by the Ethics and Equity Committee of the International Council for Computers in Education (ICCE) to obtain the opinions of experts on areas that should be covered by ethical guides for the use of computers in education and for software development, and to develop a model code of ethics for each of these areas. Conducted in 1984, the first study used two populations, a Delphi process panel of 19 nationally recognized experts who identified guidelines, and a sample of randomly selected school administrators who were asked to rate the appropriateness of these guidelines for inclusion in a code of ethics for computer use in education. The seven members of the ICCE Ethics and Equity Committee, who represented Israel, Canada, England, and a cross-section of the United States, acted as the Delphi panel for the second study, which focused on the refinement of the guidelines developed by the first one. The Delphi instrument was found to be an appropriate technique to compile the principles for the two codes, which were validated both by practitioners and the international Ethics and Equity Committee. It is noted that issues related to awareness and implementation of the code still need to be addressed by the committee. The code for computer use addresses issues related to curriculum, access to computers, software, teachers, future impact/consequences, privacy/confidentiality, students, other constituents, computer applications, quality, and school organization. The code for software development covers issues related to software, hardware, and overlapping conduct between the user and the developer. Copies of both codes are included as well as an eight-item reference list. (RP)

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A Model Code of Ethics for the Use of Computers in Education

ED286461

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Paper presented at the annual meeting
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April 16, 1986

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"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
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Downstown
By Tim Downs
OKAY! WHERE HAVE YOU KIDS BEEN GETTING ALL THE PERSONAL INFORMATION ABOUT ME?
FROM THIS DATA FILE, MA'AM.
DON'T YOU KIDS KNOW THAT IT'S TOTALLY UNETHICAL TO TAMPER WITH SOMEONE ELSE'S DATA FILES?! WHOSE FILE IS IT?
SOMEBODY NAMED "CHUCK LAYLO," MA'AM.
WHAT?!
DON'T JUST STAND THERE, SHOW ME HOW TO DELETE!

Introduction

This cartoon represents many of the ethical contradictions inherent in the use of computers in education. The privacy/confidentiality issue is a main source of controversy, though not quite on the level of software copyright violations. Educators argue that software is overpriced and that they, as teachers, have a responsibility to provide the best education to as many students as possible. Software developers counter that this ideology does not justify violating copyright laws and depriving the developers of just royalties as Bob Dylan once said, "good and bad, I define these terms quite clear, no doubt, somehow."[2]

The first question arises as to what is meant by the term ethics. For the purposes of this paper, "ethics" is defined in the following manner:

A son asks his father the meaning of the word "ethics." The father responds by saying, "Rather than try to explain what ethics means, let me explain this rather subtle concept by means of an example. Let's assume a woman comes into the store and purchases a small item. After I carefully wrap the package and give it to her, I compute the cost to be exactly $10. She hands me a crisp new $10 bill and starts to leave the store. I notice the bill is heavy and start crinkling it, whereupon I discover a second $10 bill stuck to it. Do you see the picture my son?"

"Yes, Papa."

Now this is where ethics comes in--Do I, or do I not tell my partner.

For our discussion, ethics can be considered a highly structured system of policy statements related to a particular profession's expressed code of values and standards of conduct.

The second question that arises regarding the impact of computers on society: "does it warrant special treatment in ethical conduct?"

"Please, sir, I want some more."

The master was a fat, healthy man; but he turned very pale. He gazed in stupefield astonishment on the small rebel for some seconds, and then clung for support to the copper. The assistants were paralyzed with wonder; the boys with fear.

"What!" said the master at length, in a faint voice.

"Please, sir," replied Oliver, "I want some more."[3]

Oliver Twist by Charles Dickens has become a classic of literature. Ironically, if someone at the beginning of the Industrial Revolution had had the foresight to develop a Code of Ethics to serve as a guideline in how to deal with management and labor issues, the world would have lost this classic, and others, for they would not have been necessary. Of course, the world also would have lost workhouses, riots such as the Haymarket Square Riot, labor union and management confrontations, as well as, much human suffering and other tribulations.

Therefore, as Alvin Toffler in his Third Wave theorizes that the technological revolution is on a par with the Industrial Revolution, we have to ask whether we want to lay the groundwork for future literary "classics" and human suffering "or to take arms against a sea of troubles, and by opposing end them."

Time magazine, for only the fifth time in its past fifty-five years, selected a non-individual for its 1982 Man of the Year honors. John A. Meyers, editor, indicated that several human candidates might have represented 1982, but none symbolized the past year more richly, or will be viewed by history as more significant, than a machine: the "computer."[4]

This potential impact raises many fears and hopes attending the growing application of computers in education. Toffler, in his television movie of *The Third Wave*, compared the computer revolution to the invention of writing, though in our opinion the introduction of Gutenberg's printing press may be more apropros. In the middle 1800's Victor Hugo wrote in the *Hunchback of Notre Dame*:

> In the fifteenth century everything changed.
>
> Human Intelligence discovered a way of perpetuating itself, one not only more durable and more resistant than architecture, but also simpler and easier. Architecture was dethroned. The stone letters of Orpheus gave way to the lead letters of Gutenberg.
>
> This book will kill the edifice.
>
> The invention of printing was the greatest event in history. It was the parent revolution; it was the fundamental change in mankind's mode of expression, it was human thought doffing one garment to clothe itself in another; it was the complete and definitive sloughing off of the skin of a serpent which, since the time of Adam, has symbolized intelligence.
>
> When put into print, thought is more imperishable than ever; it is volatile, intangible, indestructible; it mingles with the air. In the time of architecture, it became a mountain, and made itself master of a century and a region. Now it has been transformed into a flock of birds, scattering to the four winds and filling all air and space.

The computer may very well exceed that description. Therefore, the question arises as to whether the computer will aid education in its attempt to maximize the worth of the individual, destroy education in this worthwhile but never-ending quest, or instead impact somewhere in between. It is clear with the potential future impact of computers that now is the time to lay the groundwork so that future generations will not have to have the negative impacts that phenomena such as the Industrial Revolution produced.

The Initial Study

The Ethics and Equity Committee of ICCE intends to produce a document that includes principles or policies that can be used as a guideline in the ethical use of computers in education. The committee which is international in flavor, is composed of seven (7) members, representing Israel, Canada, England, and a cross-section of the United States (Maine, Texas, Northern California and Southern California). The beginning point, and the key word is beginning, is a study completed in 1984. The purposes of this research was to:

1. Provide areas to be considered of importance for governing bodies when formulating a code of ethics for the use of computers in education.

2. Provide areas to be considered of importance for governing bodies when formulating an ethical guide for software development.

3. Assess validity of code of ethics for the use of computers in education developed in number one above by pooling opinion through the use of a questionnaire.

4. Provide both a model code of ethics for the use of computers in education as well as a model guide for software development.

Research Methodology

The action method of research is to develop new skills or approaches and to solve problems with direct application to the classroom or other applied settings. It is relevant to the everyday work world and involves a framework for problem solving and new developments. Its strength is that it is flexible and adaptive for problem solving.[6]

In action methodology, a great gain is made when the panel method, the repetition of interviews of the same person, is introduced.[7]

The Delphi designs a process that recognizes human judgement as legitimate and useful inputs in generating forecasts. It maintains that the informal judgement of a number of people is likely to be better than the judgement of a single individual, who may be misinformed or highly biased. Therefore, one of the purposes of Delphi is to exploit the specialized knowledge and judgement of experts to ascertain new factors influencing the future state of a technological developmnent.[8]

Selection of Subjects

Two separate populations were used in this study. Members of the first population developed the code of ethics for the use of computers in education. The sample consisted of individuals recommended and recognized as national experts in the area of computers, ethics, and for education. The second sample consisted of randomly selected school administrators from the population public school directory of school administrators for the County of Los Angeles.

The Delphi process panel of experts consisted of nineteen nationally recognized individuals that had a range of expertise. The individuals selected were chosen from the fields of education, computers (including, specifically, software developers), and philosophy (specifically, ethics). Individuals selected to serve on the panel sometimes overlapped in one or more areas. As a result of the ability to overlap, equal representation was not required of each group.

A sample from the second population received the survey generated from the works of the Delphi panel of experts. The population surveyed were those schools listed by the Los Angeles County Public Schools Directory 1984. The population consisted of those individuals working as public school administrators or non-

administrators in Los Angeles County schools. The individual in each school had one or more of the following characteristics:

1. Active in the field of education in California.
2. An educational equivalent of at least a Bachelors.
3. A minimum of one to five years experience in their current position.

Materials

The initial instrument used in this study was developed by the author who used, as a base for developing the instrument, guideline criteria gleaned from the survey of literature.

The completed work of the Delphi instrument provided the data necessary to develop the survey instrument. For each of the guidelines identified by the Delphi panel of experts, it was necessary to evaluate the ethical guideline and its applicability to the classroom. Each member of the second population was asked to use a rating scale wherein they were asked to rate, according to their view, the appropriateness of the ethical guideline as to its inclusion in a code of ethics for the use of computers in education.

Reliability was measured by the method of internal consistency, specifically Cronbach's Coefficient Alpha. The validity of the instrument will lie in the use of the Delphi technique to develop the instrument.

Data Analysis Procedures

The data were analyzed and presented in two ways:

1. A narrative analysis describing and summarizing the Delphi panel's guidelines for the code of ethics for the use of computers in education was made for each round including any decisions that were made by the researcher.

2. An analysis presenting the statistical data designed to determine acceptance of the guidelines by the influences of five independent variables on the

ethical guidelines. They were analyzed according to:

1. Job Type--The respondents were classified as an administrator or non-administrator.
2. School--The respondents were classified as working in an (a) elementary school, (b) middle school, (c) junior high school, or (d) high school.
3. Years--The respondents were classified according to the number of years employed in education. The classifications were (a) 5 or less, (b) 6-10, (c) 11-15, (d) 16-20, and (e) 20 or more years.
4. Age--The respondents were classified according to the age classifications of (a) 10-29, (b) 30-39, (c) 40-49, (d) 50-59, or (e) 60 or more years.
5. Experience--The respondents were classified according to whether they had (a) none, (b) 1-3, (c) 4-6, (d) 7-9, or (e) 9 or more years experience with micro-computer and/or software.

The analyses were based on calculations using analysis of variance as the major statistical calculation. The analysis of the data was made to determine if administrators and non-administrators differed significantly in their acceptance of the guidelines, as appropriate, in a code of ethics for the use of computers in education. The .05 level of confidence was used to determine significance. Additional calculations were made to determine if the independent variables two through five, separately, or in combination, significantly impacted on the acceptance or rejection of each guideline by administrators and non-administrators for a code of ethics for the use of computers in education.

Analysis of Data

Purposes One and Two stated that a panel of experts using the Delphi process would be able to generate a set of guidelines for governing bodies when formulating a code of ethics for the use of computers in education as well as

generate a set of guidelines for governing bodies when formulating an ethical guide for software development. Through the use of the Delphi process, the Delphi panel of experts was successful in developing one hundred and seventeen guidelines.

The guidelines were classified according to whether they were curriculum issues, access to computers issues, software issues (users), teacher-related issues, future impact/consequence issues, privacy/confidentiality issues, student issues, other constituents issues, application areas issues, quality issues, school organizational issues, software issues (developer), hardware issues (developer), and overlap issues.

Purpose Three stated that, given a set of guidelines for formulating a code of ethics for the use of computers in education developed by a panel of experts, practitioners in the field of education will validate the guidelines as being appropriate for use in educational institutions. Items indicating general acceptance numbered 72, while items indicating strong acceptance numbered 45.

For each evaluation guideline, the dependent variable was evaluated for acceptance with respect to five independent variables. Based on a $p < .05$, nine of a possible 585 combinations of independent variables on the ethical guidelines caused significant influence.

Purpose Four stated that a model code of ethics for the use of computers in education as well as a model guide for software development would be provided. The researcher developed a preamble with eleven principles for the Code of Ethics for the Use of Computers in Education, a preamble with two principles as a model guide for software development, and a policy statement on overlapping issues.

The model code of ethics developed is located at the end of this article.

The Second Study

The ICCE Ethics and Equity Committee used a Delphi Technique for the refinement of the existing code. The committee itself was to be the population used to accomplish this task. The first round was initiated. After the responses were received the following procedure was adopted for the second round:

1. All new items are included in Round II and can be identified by the 14.3 figure in the percent responding.
2. Any item receiving two (2) frequencies or less were deleted from Round II.
3. The overwhelming response to the former Principle IX--Application Area Issues was that it was redundant and incorporated throughout the Code and thus was deleted.
4. The overwhelming response to the former Principle III--Overlapping Issues (Developers) was that it was confusing and redundant and thus was deleted with individual items that received (3) frequencies or more moved to Principles I and II of Developers.
5. The response to the former Principle V--Future Impact/Consequence Issues was that it should not be a separate principle. Thus, the sub-issues were moved either to the principles of Teacher-Related issues or Student issues.
6. At the suggestion of the respondents some sub-issues were either relocated to more appropriate principles or deleted as being duplicated elsewhere in other principles.
7. Wording changes were incorporated as indicated. In case of conflicting suggestions on the same wording a subjective decision was made either to combine or utilize the most appropriate one.

In summary, much of the "pretentiousness" and duplication has been eliminated with the hopes that after this round even more will be done.

For the final round the following was done:

1. A member of the committee conducted a statistical analysis of the most recent Delphi. Based upon his interpretive analysis the following variation to our past format was adopted:
   a. for each principle the introductory paragraph was restated, immediately followed by those underlying goals/issues which have consistently been selected by most respondents; for these particular goals/issues, the respondents will not be allowed to evaluate them in this final round of the Delphi (viz., they are automatically included within the principle addressed);
   b. for each principle another Delphi-oriented response is being solicited for those underlying goals/issues which have not been consistently selected by the respondents; in this case, the respondents will have a final chance to elect (or exclude) each of these particular goals/issues from inclusion within the principle addressed);
2. Any item receiving two (2) frequencies or less were deleted from Round II.
3. At the suggestion of the respondents some sub-issues were either relocated to more appropriate principles or deleted as being duplicated elsewhere in other principles.
4. Wording changes were incorporated as indicated. In case of conflicting suggestions on the same wording a subjective decision was made either to combine or utilize the most appropriate one.

5. *The response to the former Developers section has been consistently weak. Thus, at the suggestion of several respondents applicable sub-issues were relocated to Principle III--Software and Principle VIII--Hardware with the corresponding, Preamble deleted. This is consistent with the objective of consolidating and reducing duplication so the code can be more manageable.*
6. *The newly suggested title is "Code of Ethical Conduct for the use of Computers in Education." If another title is to be suggested place it at the top of Delphi.*
7. *On both rounds thus far the term "educator" and what it means has come into question. A solution has been proffered by a few members and that is to change the term "educator" to "I". This has been incorporated into the principles and a new revision of the preamble. (See Delphi). Here is the former preamble as finalized by the first two rounds.*

The final results are to be reviewed at the NECC conference in June, 1986 in San Diego.

Conclusion

1. It is possible to construct a code of ethics for the use of computers in education. In both studies the delphi instrument was an appropriate technique to compile the principles in the code.

2. The initial study was validated by practitioners. There were no significant differences according to job specification.

3. The second study, incorporating an international perspective, validated and refined the initial code of ethics.

4. Questions relating to awareness and implementation of the code are more difficult to answer. These issues will be addressed by the Ethics and Equity Committee of ICCE.

Code of Ethics for the Use of Computers in Education

Preamble.

Users.

The educator, both administrator and non-administrator, believes in the worth and dignity of human beings and will retain said belief in relation to the impact of the oncoming computer revolution. The educator will continue to recognize the supreme importance of the pursuit of truth and devotion to excellence but will add the dimension of maintaining these ideals while utilizing computerized learning augmentation. The educator will continue to regard as essential to these goals the protection of freedom to learn and to teach, and the guarantee of equal educational opportunity for all. The educator accepts the responsibility to practice the profession according to the highest ethical standards.

The educator recognizes the magnitude of the responsibility of being in the forefront of establishing precedence in the use of computers in education, and engages individually and collectively with other educators to judge colleagues, and to be judged by them, in accordance with provisions of this code.

Principle I. Curriculum Issues.

The educator is responsible for the role of computers in the school curriculum. The educator is responsible for being aware of intended and unintended consequences of computer-based courses as well as the integration of computers into all aspects of the curriculum. In fulfilling these goals, the educator:

a. Should evaluate the type of computer instruction being given and to whom it is being given. The educator should evaluate what purposes are being served.

b. Should evaluate where computers are and are not applicable.

c. Should strive towards integrating throughout the curriculum the use of computers at all levels.

d. Should strive towards equity within departments and subject areas in regard to computer access and use.

e. Should provide equality in access to computer-related experience.

f. Should evaluate the computer's effectiveness toward achieving the educator's goals.

g. Should provide teacher training for integrating computers throughout the curriculum.

h. Should evaluate software dealing with controversial activities.

i. Should accept the moral obligation not to illegally copy another's product.

j. Should respect the right to privacy of the individual.

Principle II. Access to Computer Issues.

The educator bears responsibility for the development of policy relating to the extension of educational opportunities for all and for the interpretation of educational programs and policies to the public. This includes equitable computer time access as well as ensuring resource allocation to provide equal computer educational access. In fulfilling these goals, the educator:

a. Should strive for all students to have equal access to computer use. This can be accomplished by striving for:
   1. Socio-economic status equality access.
   2. Race equality access.
   3. Sex equality access.
   4. Academic achievement equality access.
   5. Ensurance that material is not restricted to only accomplished or academic students.
   6. Exposing all students to new technology.
b. Should strive for equity among schools.
c. Should strive for natural infusion into the curriculum of all subject matter areas.
d. Should provide good curriculum material in all schools.

Principle III. Software Issues.

The educator is responsible for the acquisition, development, and dissemination of software in the school environment. In fulfilling these responsibilities, the educator:

a. Should not permit unauthorized duplication of education software by educational institutions.
b. Should not permit unauthorized duplication of printed material.
c. Should provide an atmosphere conducive to the development of quality software.
d. Should set policies for teacher gratuities for developing classroom software.
e. Should evaluate the quality of software for classroom use.
f. Should analyze software for equitible gender and ethnic representation.

Principle IV. Teacher-Related Issues.

The educator is responsible for the proper role of the computer--to replace the teacher, aid the teacher with menial task, or augment teaching. In order to define the teacher's role, the teacher must have a required knowledge of computers, meet computer literacy standards, and accept the responsibility to practice the profession according to the highest ethical standards. In fulfilling these goals, the teacher:

a. Should strive to obtain teacher training.
b. Should strive for computer literacy.
c. Should not be involved in illegal software use such as illegal copying.
d. Should not be involved in situations which could cause a conflict of interest.
e. Should allow for the teaching of the ethics of computer use to students.
f. Should be included in the equitable management of computer resources.
g. Should be included in the participation in content selection.

h. Should be included in the participation in evaluation of results.
i. Should be included in the selection of curriculum goals.
j. Should use computers in all areas of education.
k. Should be provided with release time for training.

Principle V. Future Impact/Consequence Issues.

The educator is responsible for the future impact and consequences of the computer in education. In fulfilling this responsibility the educator should:

a. Provide that teachers learn about future trends, possible impacts and consequences of a computerized society.
b. Provide that students learn about future trends, possible impacts and consequences of a computerized society.

Principle VI. Privacy/Confidentiality Issues.

The educator bears responsibility for the development of policy that guarantees the privacy of information and the proper use of information in a computerized society.

Principle VII. Student Issues.

The educator measures success by the progress of each student toward realization of potential as a worthy and effective citizen. In a computerized society, the educator helps fulfill this goal by:

a. Teaching computer ethics to students.
b. Not permitting unauthorized duplication of educational software by students.

Principle VIII. Other Constituents Issues.

The educator is responsible for the role of other constituents in relationship to the computer and the educational institution. This includes the roles of other groups, such as the PTA. The educator is responsible for determining standards when dealing with vendors and standards for selection of outside human resources. In fulfilling these responsibilities, the educator should:

a. Serve the community by providing training within the community.
   1. Parent involvement.
   2. Coordination between the home and the school.
   3. Parent and community knowledge of computers in education.
b. Provide legislative and school board training so their members can grasp and support a workable program.
c. Provide a process whereby the selection of courseware content is open and public.
d. Allow pupil participation in identifying goals, relevant content, and evaluation procedures.
e. Develop a software sharing policy.
f. Not accept software illegally copied by parents.
g. Evaluate what control donors should have over the use of hardware and software they provide.

Principle IX. Application Areas Issues.

The educator is responsible for the role of the educator in relation to the computer. In fulfilling this responsibility the educator must allow for:

a. Individual teacher's philosophy.
b. Objectives of the curriculum.
c. Evaluation of the curriculum.
d. Teacher-student activities.
e. Independent study.

Principle X. Quality Issues.

The educator is responsible for the maintenance of quality regarding the use of computers in educational institutions. In fulfilling this responsibility, the educator:

a. Should set standards for the acquisition, development, and dissemmination of hardware.
b. Should set standards for the acquisition, development, and dissemination of software.

Principle XI. School Organizational Issues.

The educator is responsible for the role of computers in organizing the school. In fulfilling this responsibility, the educator should:

a. Provide organizational plans to introduce and manage computers in schools.
b. Provide acquisition and funding sources for computers in schools.

Developers.

The developer believes in the worth and dignity of human beings and will retain said belief in relation to the impact of the oncoming computer revolution. The developer will regard as essential to these goals the protection of freedom to learn and to teach and the guarantee of equal educational opportunity for all. The developer accepts the responsibility to practice the profession according to the highest ethical standards.

The developer recognizes the magnitude of the responsibility of being in the forefront of establishing precedence for the use of computers in education, and engages individually and collectively with other developers to judge colleagues, and to be judged by them, in accordance with provisions of this code.

Principle I. Software.

The developer is responsible for the development of software for educational institutions. In fulfilling this responsibility, the developer should:

a. Provide equitable gender and ethnic representation in software presentation.
b. Provide "equal opportunity" curriculum inclusion of software for all areas, i.e., not just mathematics.
c. Provide for integration and relativity to current curriculum.
d. Provide adaptive software for diagnostic and summative forms of evaluation.
e. Adhere to software evaluation policies of educational institutions by providing flexibility in the software development.
f. Adhere to truth in advertising.
g. Provide for fair profits, not "rip-off" or excessive profits.
h. Adhere to privacy standards.
i. Respect software copyrights.
j. Not knowingly permit unauthorized duplication of software.

Principle II. Hardware:

The developer is responsible for the development of hardware for educational institutions. In fulfilling this responsibility, the developer should:

a. Provide equitable access to hardware to institutions.
b. Provide for the appropriate hardware element of user interface for the student user (e.g., availability of special interface devices for physically limited students).
c. Allow for software availability
d. Provide hardware training.
e. Provide standard software copying services.
f. Provide equitable accessibility of computers to students.
g. Allow for cooperative participation of teachers and administration in the selection of equipment.
h. Provide support services.
i. Allow "connectibility" of their product into networks.
j. Provide multiple machine licensing or networking.

Principle III. Overlapping Conduct.

There is overlap between the user and the developer, therefore:

a. *The developer should try to produce a quality program for the user--one that will serve the potential user's needs and interests.*
b. *The evaluation of a product must consider future technological possibilities and other needs.*
c. *The user may be liable for copyright violations, etc.*
d. *The developer may inadvertently compromise the student's privacy.*
e. *The developer must be aware of the production and use of poor vs. good software.*
f. *The user must allow for copy protection to the developer.*
g. *The developer should understand the curriculum concerns of teachers.*
h. *The developer should understand hardware and software educational evaluation standards.*
i. *The developer should provide software that is adaptable, thereby allowing long-term use.*
j. *The developer should understand the objectives of the curriculum.*
k. *The developer should provide after-purchase support.*
l. *The developer should provide stimulating, educationally relevant software.*

Footnotes

[1] Downs, Tim. Los Angeles Times. View Section, April 7, 1984, p 9.

[2] Dylan, Bob. "My Back Pages" Writings and Drawings. New York: Alfred A. Knopf, Inc., 1973, p 133.

[3] Dickens, Charles Oliver Twist New York: Washington Square Press, 1971, p. 14.

[4] Time. "Machine of the Year." 121, (1), January 3, 1983, p. 16.

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[6] Isaac, Stephen, and Michael, William B. Hardbook in Research and Evaluation. Second Edition, San Diego, CA: Edits, Publishers, 1981, p. 55.

[7] Campbell, Donald T. and Stanley, Julian C. Experimental and Quasi-Experimental Designs to Research. Boston: Houghton Mifflin Company, 1963, p. 67.

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